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ABSTRACT

The Computer Attitude Questionnaire (CAQ) is a Likert-type self-report instrument with paired-comparison items added to provide supplemental information. The CAQ is intended for use in the middle school environment, grades six to eight. A 1993 preliminary validation study indicated the instrument's stable measurement qualities and probable usefulness. This paper reports the findings of a 1995 validation study of the CAQ. Data from 588 junior high school students in a Texas public school were used to validate the construct and criterion-related validity of the CAQ. A confirmatory factor analysis revalidated the psychological constructs carried over the instrument's predecessor, the Young Children's Computer Inventory Questionnaire, and high internal consistency reliability figures further reconfirmed the stability of the newer subscales that were added for middle school students. Pilot use of the instrument verified that junior high school students receiving computer literacy training through thematic, teacher-teaming activities enjoyed computers more, felt them to be more important, and rated themselves as more creative than counterparts in traditional computer literacy classes. Results were considered sufficient to demonstrate the discriminant validity of the CAQ. Appendixes A and B list some items by construct and as paired, and Appendix C presents the CAQ. (Contains eight tables and eight references.) (SLD)

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Validating the Computer Attitude Questionnaire (CAQ)

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Validating the Computer Attitude Questionnaire (CAQ)

1. Introduction

The Computer Attitude Questionnaire (CAQ) is a Likert-type self-report instrument with paired-comparison items added to provide supplemental information. The CAQ is intended for use in the middle school environment, grades 6-8. Its 62 Likert-type items include all 48 items from the Young Children's Computer Inventory questionnaire (YCCI), which was developed by Miyashita and Knezek (1992) to gather data from children in grades 1-3. Paired-comparison items are from a research instrument used by Krendl and Broihier (1992) for their longitudinal study of student responses to computers.

A preliminary study of 1993 data gathered from 240 students in grades 1-8 attending a rural north Texas public school district indicated that the CAQ had stable measurement properties in the upper grade ranges (4-8) and would probably be useful in the middle school environment for which it was originally designed (Knezek and Miyashita, 1994). As a result, in 1995, a validation study was conducted using 588 students in grades 7-8 from a central Texas junior high school. The purpose of this paper is to report the findings of the 1995 validation study of the CAQ.

2. Instrument Composition

CAQ Likert-type items measure attitudes (feelings toward a person or thing) and prevailing attitudes (dispositions), rather than achievement. Respondents circle a number to indicate whether they 1) strongly disagree, 2) disagree, 3) agree, or 4) strongly agree with the statement in each item stem. Up to eight psychological indices can be produced by summing responses to related items. Six indices are shared in common with the YCCI. These six include two kinds of attitudes toward computers and four other learning-related indices: Computer Importance, Computer Enjoyment, Study Habits, Empathy, Motivation/Persistence, and Creative Tendencies. Two indices are new for the CAQ. These are Computer Anxiety and Computer Seclusion. All items contributing to each subscale are listed in Appendix A.

The paired comparison items on the CAQ provide relative ratings of computer use compared to watching television, reading a book, and writing, in the categories of Computer Preference (preferred use), Computer Difficulty (difficulty of use), and Computer Learning (perceived usefulness for learning). These items are listed in Appendix B.

Major similarities and differences in item selections for the YCCI versus the CAQ are summarized in Table 1. The complete questionnaire is provided in Appendix C.

3. Construct Validity

Construct validity for the six subscales carried over to the CAQ from the YCCI was previously established through several studies and is summarized in the YCCI Handbook (Knezek and Miyashita, 1993). The newly developed CAQ indices of Computer Anxiety and Computer Seclusion will be the focus of the current discussion.

Computer Seclusion was identified through a higher-order factor analysis of 1993 YCCI data gathered from grades 1-8 at a public school in northern Texas. Because this factor did not emerge among data for children from grades 1-4, it was hypothesized that this attribute might become stronger as children grow older. 1995 data was gathered from a large number of middle school students, in part, to test this hypothesis. As reported in the following section, the high internal reliability for this scale for 1995 data supports the construct validity of this subscale.

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Table 1.
YCCI vs. CAQ Item Selection

SCALE	YCCI Version 3	CAQ Version 1
Computer Importance	9	7
Computer Enjoyment	5	9
Computer Anxiety	none	8
Computer Seclusion	none	13
Motivation/Persistence	6	9
Study Habits	7	10
Empathy	9	10
Creative Tendencies	13	13
Computer Preference	none	1(6 pairs)
Computer Difficulty	none	1(6 pairs)
Computer Learning	none	1(6 pairs)
Total Items	**48**	**65**

Computer Anxiety items were selected from various published instruments developed to produce indices in this area for adults. Analysis of the 1993 grade 1-8 data which included these items indicated young children (grades 1-4) tended to perceive computer anxiety as the opposite of enjoyment, while older students tended to view anxiety as somewhat independent of enjoyment. Therefore, it was hypothesized that Computer Anxiety would emerge as a factor independent of Enjoyment for middle school students in 1995 data. Factor analyses (ULS, Oblimin rotation) extracting 5, 6, and 7 factors as the most probable number of meaningful indices[1], all resulted in Computer Anxiety separated from Computer Enjoyment and Computer Importance. In addition, the 8 items most strongly related to Computer Anxiety were the same in each of the 5, 6, and 7-factor solutions. This provides further evidence for the independent construct of Computer Anxiety existing in middle school students.

.5. Criterion-Related Validity

The junior high school providing data for the validation study requested that the researchers make a preliminary comparison of possible effects of thematic integration (group 2) versus a computer literacy course (group 1) versus a combined approach (group 3), as alternative methods of teaching information technology applications to students. In the three groups combined, there were 588 subjects. Of these subjects, 356 were seventh graders and 232 were in the eighth grade. Fifty-two percent (292) of the subjects were male, while 48% (271) were female students. All students had been pseudo-randomly assigned to one of the three groups based on computer lab capacities and scheduling constraints imposed by other curricular offerings.

[1] Based upon examination of a scree plot of the eigenvalues for all theoretically-derivable factors (Dunn-Rankin, 1983).

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Table 2 contains summary statistics for the combined group of 588 students on six Likert subscales and twelve preference ratings for paired comparisons items. Table 3 contains mean scores for the three groups on each of six subscales. Using one way analysis of variance (ANOVA), it was determined there were overall significant differences among the groups for Computer Importance (f=7.92, 557 X 2 df, p<=.0004), Computer Enjoyment (f=11.27, 551 X 2 df, p=.0000), Creative Tendencies (f=4.10, 543 X 2 df, p =.0171) and Empathy (f=3.31, 549 X 2 df, p=.0374) at the alpha = .05 level. Post-hoc comparisons (alpha = .025) were carried out in these three areas to determine which specific groups were significantly different from the others, and in which direction. Group 2 (thematic integration) was found to be significantly higher than group 1 (computer literacy class) on Computer Importance, Computer Enjoyment and Creative Tendencies.

Table 2.
Summary Statistics
(N=588)

Variable Label	Mean	Std Dev	Minimum (Theoretical)	Maximum	Valid N
I	3.11	.56	1.00	4.00	560
J	3.20	.52	1.00	4.00	554
M	2.62	.52	1.00	4.00	556
S	2.63	.50	1.00	3.90	549
E	2.95	.58	1.00	4.00	552
C	2.83	.49	1.00	4.00	546
ANXIETY	3.15	.57	1.00	4.00	565
SECLUSN	2.83	.44	1.00	4.00	537
PREAD	.91	.89	.00	3.00	588
PWRITE	.52	.71	.00	3.00	588
PTV	1.89	1.04	.00	3.00	588
PCOMP	1.90	1.05	.00	3.00	588
DREAD	1.40	.94	.00	3.00	588
DWRITE	1.93	1.09	.00	3.00	588
DTV	.32	.73	.00	3.00	588
DCOMP	1.47	1.03	.00	3.00	588
LREAD	1.57	1.01	.00	3.00	588
LWRITE	.46	.71	.00	3.00	588
LTV	.81	.85	.00	3.00	588
LCOMP	2.02	1.00	.00	3.00	588

Legend: I=Computer Importance, J=Computer Enjoyment. M=Motivation/Persistence, S=Study Habits, E=Empathy, C=Creative Tendencies

No group was significantly (p=.025) higher or lower than the others on Empathy. However, examination of the means provided in Table 3 indicates the trend is for Group 3 (combined technology integration and computer literacy class) to be lower than either Groups 1 or 2.

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Table 3.
Mean Scores For Three Student Groups on Six Psychological Dispositions

	I	J	M	S	E	C
Group 1 (Comp. Lit.)	3.02	3.08	2.58	2.60	2.93	2.76
Group 2 (Integration)	3.20	3.29	2.66	2.67	2.99	2.89
Group 3 (Both)	2.92	3.21	2.55	2.46	2.66	2.79

Because it is possible that different grade levels could have caused the findings to be different, a one way ANOVA was performed looking at all seventh grade students in each of the three groups. Because the number of subjects was small for group 3, no conclusions were drawn in comparison to the other groups. A significant difference ($p=.01$) was found in both Computer Importance and Empathy in these seventh graders. Specifically, group 2 (integration group) tended to be more empathetic. They also considered computers to be more important than their seventh grade counterparts in the other two groups. Mean values for seventh grade students on the six psychological indices are shown in Table 4.

Table 4.
Mean Values On Six Psychological Dispositions For Three Groups (Seventh Grade Students Only)

	I	J	M	S	E	C
Group 1 (Comp. Lit.)	2.81	3.08	2.73	2.74	2.55	2.70
Group 2 (Integration)	3.20	3.30	2.66	2.67	2.99	2.89
Group 3 (Both)	2.92	3.21	2.55	2.46	2.66	2.80

Gender differences. Significant male-female differences were found regarding reported Study Habits and Empathy. Females were significantly higher than males in Study Habits ($f=6.12$, 525 x 1 df, $p=.0137$). As shown in Table 4 females were found to be higher in Empathy than males at the $p<.001$ level of significance ($f=165.72$, 527 x 1 df, $p=.0000$). No significant differences were found with respect to gender for Computer Importance, Computer Enjoyment, Motivation or Creative Tendencies.

When comparing males to females in Group 1 (computer literacy) alone, females continued to be significantly higher on Study Habits and Empathy. However, when looking at gender differences in Group 2 (integration) alone, females were significantly higher only in Empathy.

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Table 5.
Mean Values On Six Psychological Dispositions For Male And Female Students

	I	J	M	S	E	C
Male	3.13	3.21	2.61	2.58	2.68	2.82
Female	3.09	3.18	2.62	2.68	3.24	2.85

Comparisons among the females in the three curricular methods groups showed a significant difference in Computer Enjoyment between group 1 and group 2. The females in Group 2 rated Computer Enjoyment significantly (p=.01) higher than group 1. Mean values for females are shown in Table 6.

Table 6.
Mean Values for Female Students in Three Curricular Approaches

	I	J	M	S	E	C
Group 1 (Comp. Lit.)	3.00	3.05	2.63	2.68	3.22	2.78
Group 2 (Integration)	3.16	3.28	2.61	2.67	3.24	2.90
Group 3 (Both)	3.14	3.56	2.89	2.90	3.58	3.12

Table 7.
Mean Values for Male Students in Three Curricular Approaches

	I	J	M	S	E	C
Group 1 (Comp. Lit.)	3.05	3.12	2.55	2.53	2.63	2.75
Group 2 (Integration)	3.21	3.29	2.68	2.64	2.74	2.88
Group 3 (Both)	2.87	3.13	2.44	2.31	2.38	2.68

No curricular group for males was found to be significantly different from the others (alpha = .025) even though there was significant variation overall (across all 3 groups) at the alpha = .05 level. As shown in Table 6. the trend was for group 3 to be lower than group 1 or group 2 for Computer Importance, Study Habits and Empathy; Group 2 tended to be higher than 1 or 3 on Computer Enjoyment.

Discussion. These findings indicate that the students participating in the integrated computer activities enjoyed computers more and perceived them as more important than the students taking computer literacy classes. In addition, the students involved in the integrated, teacher-teaming computer activities rated themselves as higher in creative tendencies than their peers enrolled in computer literacy. The most prominent gender difference was in the area of Empathy. Females were consistently higher than males, as has been previously found by YCCI researchers for grades 1-3 students in Texas, Mexico and Japan (Knezek & Miyashita,

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1993). Also consistent with YCCI findings for grades 1-3 is no apparent gender bias in attitudes toward computers among junior high students. In addition, no consistent gender differences were found to be attributable to type of computer curriculum.

Conclusions regarding criterion-related validity. Significant (p=.05) differences were found to be attributable to type of computer curriculum and/or gender on five of the six Likert-type scales on the Computer Attitude Questionnaire. These results were deemed sufficient to demonstrate the discriminating power of the CAQ, and provide further evidence of its construct validity.

6. Post-Hoc Reliability Estimates

Post-hoc reliability estimates calculated for the combined seventh and eighth grade data (SPSS, 1984) indicted that the overall internal consistency reliability for the total Likert scale portion of the CAQ is .94, utilizing 53 of the 62 Likert items contained in the instrument. Cronbach's Alpha indices for the subscales range from a low of .80 to a high of .87 (see Table 8). All of these indices are in the "very good" range according to the guidelines provided by DeVellis (1991, p.85) regarding acceptable reliabilities for research instrument scales.

Table 8.
Internal Consistency Reliability For CAQ
Likert-Type Subscales Based on 1995 Data
(N=588)

	# ITEMS	OVERALL	ITEMS CONTRIBUTING
COMPUTER IMPORTANCE	7	.82	3,6,8,9,10,11,12
COMPUTER ENJOYMENT	9	.82	1,2,4,5,10,49,50,51,54
COMPUTER ANXIETY	8	.84	7,13,50,51,52,53,54,55
COMPUTER SECLUSION	13	.81	6,11,17,18,19,22,25,38,53,55, 56,57,60
MOTIVATION/ PERSISTENCE	9	.80	15,16,17,19,21,22,23,60,61
EMPATHY	10	.87	26,27,28,29,30,31,32,33,35,59
STUDY HABITS	10	.82	15,18,19,20,23,24,25,57,58,60
CREATIVE TENDENCIES	13	.86	36,37,38,39,40,41,42,43,44,45, 46,47,48
OVERALL	53	.94	1,2,3,4,5,6,8,9,10,11,12,15,16, 17,18,19,20,21,22,23,24,25,26, 27,28,29,30,31,32,33,35,36,37, 38,39,40,41,42,43,44,45,46,47, 48,49,50,51,54,57,58,59,60,61

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Internal consistency reliability for the paired comparisons portion of the CAQ is also thought to be quite high. Although computing facilities were not available to analyze the reliability of the paired comparisons data gathered in 1995, a circular triad analysis of 1993 paired comparisons data (n=210) at the University of Hawaii indicated reliabilities of .90 for Computer Preference, .89 for Computer Difficulty, and .92 for Computer Learning (Dunn-Rankin, 1983; Knezek & Miyashita, 1994). Since data from students in grades 4-8 was included in the 1993 analysis, it is probable that data gathered exclusively from middle school students (grades 6-8) will be at least as reliable.

7. Summary

Data from 588 junior high students attending a Texas public school during 1995 were used to validate the construct and criterion-related validity of the Computer Attitude Questionnaire (CAQ). A confirmatory factor analysis re-validated the psychological constructs carried forward from the instrument's predecessor, the Young Children's Computer Inventory questionnaire, and high internal consistency reliability figures (.80-.87) resulting from post-hoc subscale reliability assessments further reconfirmed the stability of newer subscales added for middle school students. Pilot utilization of the instrument verified that junior high students receiving computer literacy training through thematic, teacher-teaming activities, enjoyed computers more, felt them to be more important, and rated themselves as more creative than their counterparts enrolled in traditional computer literacy classes. In addition, female students rated themselves more empathetic than their male counterparts. These results were deemed sufficient to demonstrate the discriminant validity of the CAQ.

References

Christensen, R. and Knezek, G. (1995, June). A comparison of two computer curricular programs at a Texas junior high school using the Computer Attitude Questionnaire (CAQ). Denton, TX: Telecommunications and Informatics Laboratory Technical Report 95.1.

DeVellis, R.F. (1991). Scale Development: Theory and Applications. Newbury Park: Sage Publications, Chapter 4.

Dunn-Rankin, P. (1983). Scaling methods. Hillsdale, NJ: Lawrence Erlbaum Associates.

Knezek, G., & Miyashita, K. (1993). Handbook for the Young Children's Computer Inventory. Denton, TX: Texas Center for Educational Technology.

Knezek, G. and Miyashita, K (1994). A preliminary study of the Computer Attitude Questionnaire. In Knezek, G. (Ed.) Studies on children and computers: The 1993-94 Fulbright Series. Denton, TX: Texas Center for Educational Technology.

Krendl, K.A. and Broihier, M. (1992). Student responses to computers: A longitudinal study. J. Educational Computing Research, 8(2), 215-227.

Miyashita, K. & Knezek, G. (1992). The Young Children's Computer Inventory: A Likert Scale for assessing attitudes related to computers in instruction. Journal of Computing in Childhood Education, 3, 63-72.

SPSS (1984). SPSS-x BASICS. New York: McGraw-Hill.

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Appendix A.
CAQ Likert-Type Items by Psychological Construct

Computer Importance

(3) I will be able to get a good job if I learn how to use a computer.
(6) I would work harder if I could use computers more often.
(8) I know that computers give me opportunities to learn many new things.
(9) I can learn many things when I use a computer.
(10) I enjoy lessons on the computer.
(11) I believe that the more often teachers use computers, the more I will enjoy school.
(12) I believe that it is very important for me to learn how to use a computer.

Computer Enjoyment

(1) I enjoy doing things on a computer.
(2)* I am tired of using a computer.
(4) I concentrate on a computer when I use one.
(5) I enjoy computer games very much.
(10) I enjoy lessons on the computer.
(49) I feel comfortable working with a computer.
(50)* I get a sinking feeling when I think of trying to use a computer.
(51)* Working with a computer makes me nervous.
(54)* Computers are difficult to use.

Computer Anxiety

(7)* I think that it takes a long time to finish when I use a computer.
(13) I think that computers are very easy to use.
(50)* I get a sinking feeling when I think of trying to use a computer.
(51)* Working with a computer makes me nervous.
(52)* Using a computer is very frustrating.
(53)* I will do as little work with computers as possible.
(54)* Computers are difficult to use.
(55) Computers do not scare me at all.

Computer Seclusion

(6) I would work harder if I could use computers more often.
(11) I believe that the more often teachers use computers, the more I will enjoy school.
(17) When I don't understand a problem, I keep working until I find the answer.
(18) I review my lessons every day.
(19) I try to finish whatever I begin.
(22) I think about many ways to solve a difficult problem.
(25) If I do not understand my teacher, I ask him/her questions.
(38) When I think of a new thing, I apply what I have learned before.
(53)* I will do as little work with computers as possible.
(55) Computers do not scare me at all.
(56)* I can learn more from books than from a computer.
(57) I listen to my teacher carefully.
(60) I study hard.

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Appendix A. (Cont.)

Motivation/Persistence

(15) I study by myself without anyone forcing me to study.
(16) If I do not understand something, I will not stop thinking about it.
(17) When I don't understand a problem, I keep working until I find the answer.
(19) I try to finish whatever I begin.
(21) I enjoy working on a difficult problem.
(22) I think about many ways to solve a difficult problem.
(23) I never forget to do my homework.
(60) I study hard.
(61) When I do a job, I do it well.

Study Habits

(15) I study by myself without anyone forcing me to study.
(18) I review my lessons every day.
(19) I try to finish whatever I begin.
(20) Sometimes, I change my way of studying.
(23) I never forget to do my homework.
(24) I like to work out problems which I can use in my life every day.
(25) If I do not understand my teacher, I ask him/her questions.
(57) I listen to my teacher carefully.
(58) If I fail, I try to find out why.
(60) I study hard.

Empathy

(26) I feel sad when I see a child crying.
(27) I sometimes cry when I see a sad play or movie.
(28) I get angry when I see a friend who is treated badly.
(29) I feel sad when I see old people alone.
(30) I worry when I see a sad friend.
(31) I feel very happy when I listen to a song I like.
(32) I do not like to see a child play alone, without a friend.
(33) I feel sad when I see an animal hurt.
(35) I feel happy when I see a friend smiling.
(59) I am glad to do work that helps others.

Creative Tendencies

(36) I examine unusual things.
(37) I find new things to play with or to study, without any help.
(38) When I think of a new thing, I apply what I have learned before.
(39) I tend to consider various ways of thinking.
(40) I create many unique things.
(41) I do things by myself without depending upon others.
(42) I find different kinds of materials when the ones I have do not work or are not enough.
(43) I examine unknown issues to try to understand them.
(44) I make a plan before I start to solve a problem.
(45) I invent games and play them with friends.
(46) I invent new methods when one way does not work.
(47) I choose my own way without imitating methods of others.
(48) I tend to think about the future.

* Reversed Items

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Appendix B.
CAQ Paired Comparisons Items

(63) Which would you rather do? (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

(64) Which would be more difficult for you (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

(65) Which would you learn more from (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

Appendix C. Computer Attitude Questionnaire

Name: _____

This survey contains 65 brief questions. Read each statement and then circle the number which best shows how you feel.

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

		SD	D	A	SA
(1)	I enjoy doing things on a computer.	1.	2.	3.	4.
(2)	I am tired of using a computer.	1.	2.	3.	4.
(3)	I will be able to get a good job if I learn how to use a computer.	1.	2.	3.	4.
(4)	I concentrate on a computer when I use one.	1.	2.	3.	4.
(5)	I enjoy computer games very much.	1.	2.	3.	4.
(6)	I would work harder if I could use computers more often.	1.	2.	3.	4.
(7)	I think that it takes a long time to finish when I use a computer.	1.	2.	3.	4.
(8)	I know that computers give me opportunities to learn many new things.	1.	2.	3.	4.
(9)	I can learn many things when I use a computer.	1.	2.	3.	4.
(10)	I enjoy lessons on the computer.	1.	2.	3.	4.
(11)	I believe that the more often teachers use computers, the more I will enjoy school.	1.	2.	3.	4.
(12)	I believe that it is very important for me to learn how to use a computer.	1.	2.	3.	4.
(13)	I think that computers are very easy to use.	1.	2.	3.	4.
(14)	I would like to study with a teacher rather than using a computer.	1.	2.	3.	4.
(15)	I study by myself without anyone forcing me to study.	1.	2.	3.	4.
(16)	If I do not understand something, I will not stop thinking about it.	1.	2.	3.	4.
(17)	When I don't understand a problem, I keep working until I find the answer.	1.	2.	3.	4.

(Continued)

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		SD	D	A	SA
(18)	I review my lessons every day.	1.	2.	3.	4.
(19)	I try to finish whatever I begin.	1.	2.	3.	4.
(20)	Sometimes, I change my way of studying.	1.	2.	3.	4.
(21)	I enjoy working on a difficult problem.	1.	2.	3.	4.
(22)	I think about many ways to solve a difficult problem.	1.	2.	3.	4.
(23)	I never forget to do my homework.	1.	2.	3.	4.
(24)	I like to work out problems which I can use in my life every day.	1.	2.	3.	4.
(25)	If I do not understand my teacher, I ask him/her questions.	1.	2.	3.	4.
(26)	I feel sad when I see a child crying.	1.	2.	3.	4.
(27)	I sometimes cry when I see a sad play or movie.	1.	2.	3.	4.
(28)	I get angry when I see a friend who is treated badly.	1.	2.	3.	4.
(29)	I feel sad when I see old people alone.	1.	2.	3.	4.
(30)	I worry when I see a sad friend.	1.	2.	3.	4.
(31)	I feel very happy when I listen to a song I like.	1.	2.	3.	4.
(32)	I do not like to see a child play alone, without a friend.	1.	2.	3.	4.
(33)	I feel sad when I see an animal hurt.	1.	2.	3.	4.
(34)	Sometimes children have no friends because they do not want any.	1.	2.	3.	4.
(35)	I feel happy when I see a friend smiling.	1.	2.	3.	4.
(36)	I examine unusual things.	1.	2.	3.	4.
(37)	I find new things to play with or to study, without any help.	1.	2.	3.	4.
(38)	When I think of a new thing, I apply what I have learned before.	1.	2.	3.	4.
(39)	I tend to consider various ways of thinking.	1.	2.	3.	4.

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

(Continued)

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		SD	D	A	SA
(40)	I create many unique things.	1.	2.	3.	4.
(41)	I do things by myself without depending upon others.	1.	2.	3.	4.
(42)	I find different kinds of materials when the ones I have do not work or are not enough.	1.	2.	3.	4.
(43)	I examine unknown issues to try to understand them.	1.	2.	3.	4.
(44)	I make a plan before I start to solve a problem.	1.	2.	3.	4.
(45)	I invent games and play them with friends.	1.	2.	3.	4.
(46)	I invent new methods when one way does not work.	1.	2.	3.	4.
(47)	I choose my own way without imitating methods of others.	1.	2.	3.	4.
(48)	I tend to think about the future.	1.	2.	3.	4.
(49)	I feel comfortable working with a computer.	1.	2.	3.	4.
(50)	I get a sinking feeling when I think of trying to use a computer.	1.	2.	3.	4.
(51)	Working with a computer makes me nervous.	1.	2	3.	4.
(52)	Using a computer is very frustrating.	1.	2.	3.	4.
(53)	I will do as little work with computers as possible.	1.	2.	3.	4.
(54)	Computers are difficult to use.	1.	2.	3.	4.
(55)	Computers do not scare me at all.	1.	2.	3.	4.
(56)	I can learn more from books than from a computer.	1.	2.	3.	4.
(57)	I listen to my teacher carefully.	1.	2.	3.	4.
(58)	If I fail, I try to find out why.	1.	2.	3.	4.
(59)	I am glad to do work that helps others.	1.	2.	3.	4.
(60)	I study hard.	1.	2.	3.	4.
(61)	When I do a job, I do it well.	1.	2.	3.	4.
(62)	I feel that I am a person of worth, at least on an equal plane with others.	1.	2.	3.	4.

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

(Continued)

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(63) Which would you rather do? (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

(64) Which would be more difficult for you (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

(65) Which would you learn more from (circle one of each pair):

(1) read a book	or	(2) write
(1) write	or	(2) watch television
(1) watch television	or	(2) use a computer
(1) use a computer	or	(2) read a book
(1) read a book	or	(2) watch television
(1) write	or	(2) use a computer

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